Twitch Data Analysis

Exploratory Data Analysis
By Amanda Goldsmith

About the Analysis

This analysis dives into the statistics behind the popular streaming platform called *Twitch*; which allows individuals to livestream themselves playing games or performing activities to viewers during real time. It is most notably known as a videogame streaming platform, but general live streaming channels such as “Just Chatting” or “Music” are also popular amongst viewers.

The Exploratory Data Analysis process lead me through a deep investigation of the data. Through this process, I focused this report to hone in on the top 3 most watched games from 2017 and used the EDA process to gain further insights into how these games changed alongside Twitch as a whole through 2017-2021

Twitch (aka Twitch.tv) was launched in 2011 as a spinoff of the streaming platform called Justin.tv. (created by Justin Kan and Emmett Shear) to focus solely on the gaming streams that were popular on that platform. Amazon bought out Twitch in 2014 for 970 million USD.(Kim, 2014)

About the Data

Data Provenance

The data used in this analysis was gathered through a website called SullyGnome; which takes Twitch API information, polls that every 5 minutes, aggregates it and presents it on this site that is updated on various timescales that range from hourly to weekly depending on the data. This website provides data all the way back to 2016 up to present day.

This website was created by David Boyd and has no affiliation with the streaming service itself. This individual states that this site was created to "provide information for the streamers and game developers who create the content we all love." (Boyd, 2022). He is transparent about the information gathered, how it is gathered through this site and possible inaccuracies in the data. Further information about this data source can be found here.

For the data presented in this report, the data provenance has been deemed satisfactory and represents a decently accurate recount of the Twitch statistics from the years listed. Noting and accepting that counts of the given values are most-likely not 100% exact – as Boyd has recently acknowledge data collection has improved over the years leading one to assume some flaws in the early years of collection. I feel it is important to recognize this but deem the variation in these numbers miniscule and uncompromising to the data analysis done in this report.

Data Prep and Key Terms

Data Prep

This analysis delves into the Twitch statistics from the years 2017-2021 for all languages.

On SullyGnome, I filtered through the category “Most Watched Games On Twitch” and downloaded the excel file for the first 25 games for each year listed. I compiled all of those into a single CSV file and transferred it to Tableau where all data visualizations found in the report were made.

No modifications were done to the data other than adding a year column to separate the data into the appropriate years once compiled.

Key Terms:

Rank: Represents the order of most watched games on twitch during that given year with #1 being the most watched and #25 being the 25th rank (in this analysis, that would be the least watched or lowest ranking).
Average Viewers: Represents the average amount of viewers for that particular game being streamed over the course of a year.
Average Viewer Ratio: Represents the average amount of people *per stream* in for that particular game per year
Watch Time: total number of hours watched in that particular game per year
Stream Time: total number of hours streamed in that particular game per year

Stream time **vs** ***Watch time*** **example:**

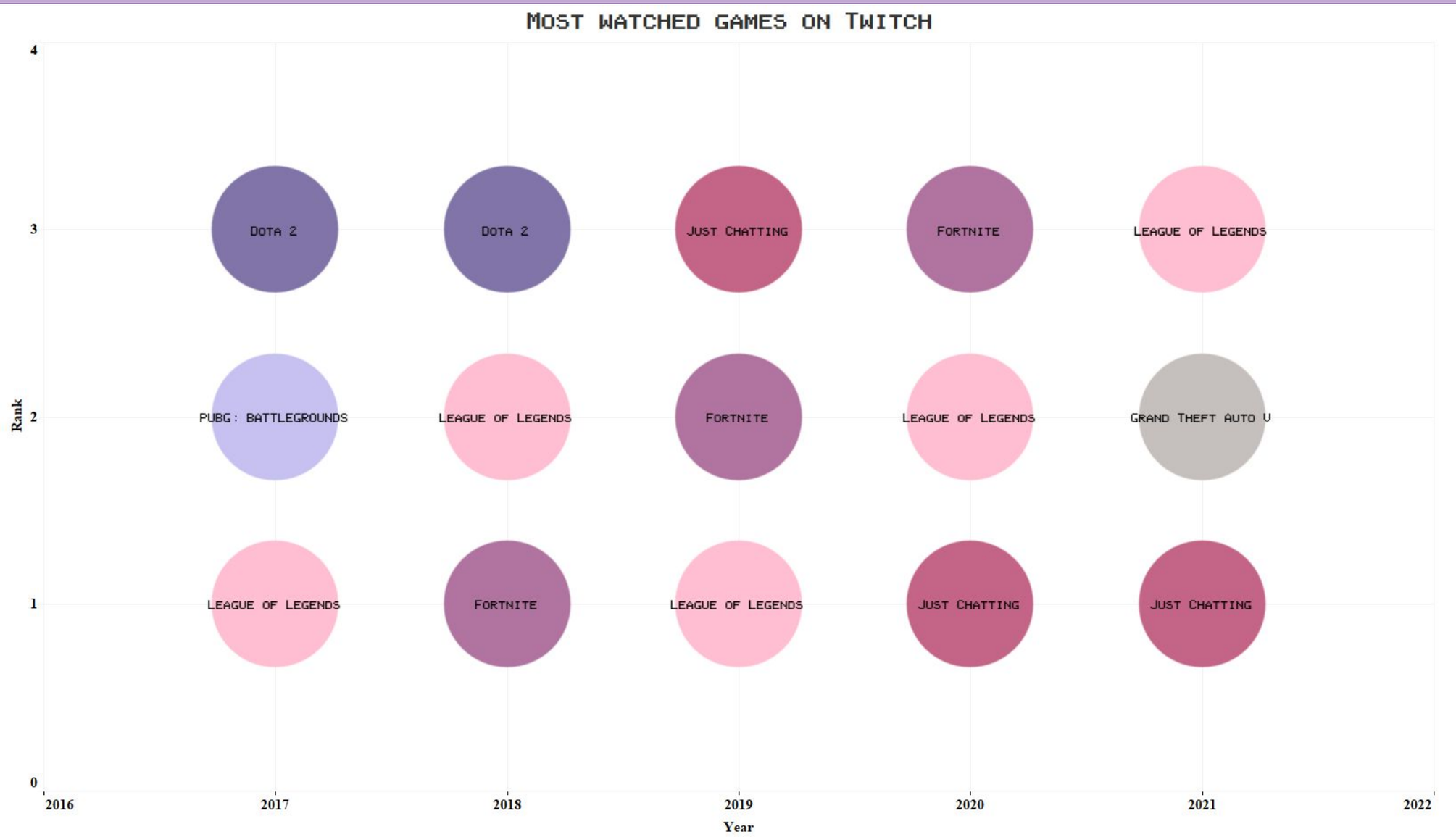
One streamer, streams one game, for one hour, to 40 people. The stream time for that game is 1 hour while the watch time for that game is 40

Questions to consider in this analysis

There are thousands of steamers streaming a particular game at one time,

- **What were the top 3 most watched games on Twitch for the years 2017-2021?**
- **How did the top 3 games being streamed in 2017 change over the next 4 years?**
  - **Did less/more people start streaming these games?**
  - **Did less/more people start watching these games?**
  - **Do the correlations between these graphs makes sense?**
- **How did the average watch time on Twitch change from 2017-2021?**
  - **Is this trend the same for average stream time and average viewers?**
    - **What insights can we get from the top games from 2017 knowing this?**
- **Are there any games that spiked in viewership/ amount of people streaming them during certain years?**
  - **Does this correlate given the context of other insights?**

Graph 1: What were the top 3 most watched games on Twitch for the years 2017-2021?



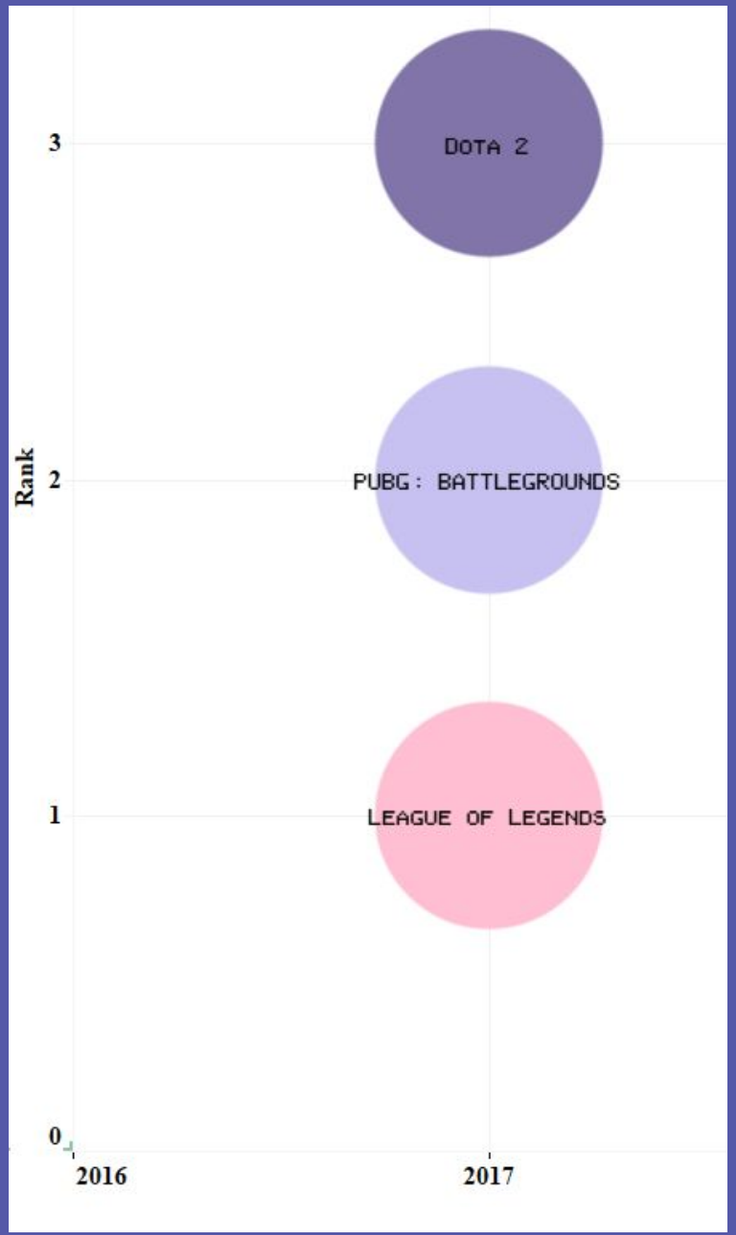
Note: “Just Chatting” is a category that streamers go live on when they are not playing a particular game. This analysis refers to the majority of channel categories on Twitch as “games” solely because Twitch is used mainly as a live streaming platform for games and therefore most of the statistics in this analysis revolve around gaming channels . Although it is important to note that “Just Chatting” “Music” and “Podcasts” are channels used for chatting, music and podcasts and not gameplay.

Looking at this data, one can see many games stayed in the top 3 most watched games on Twitch over the course of 2017-2021.

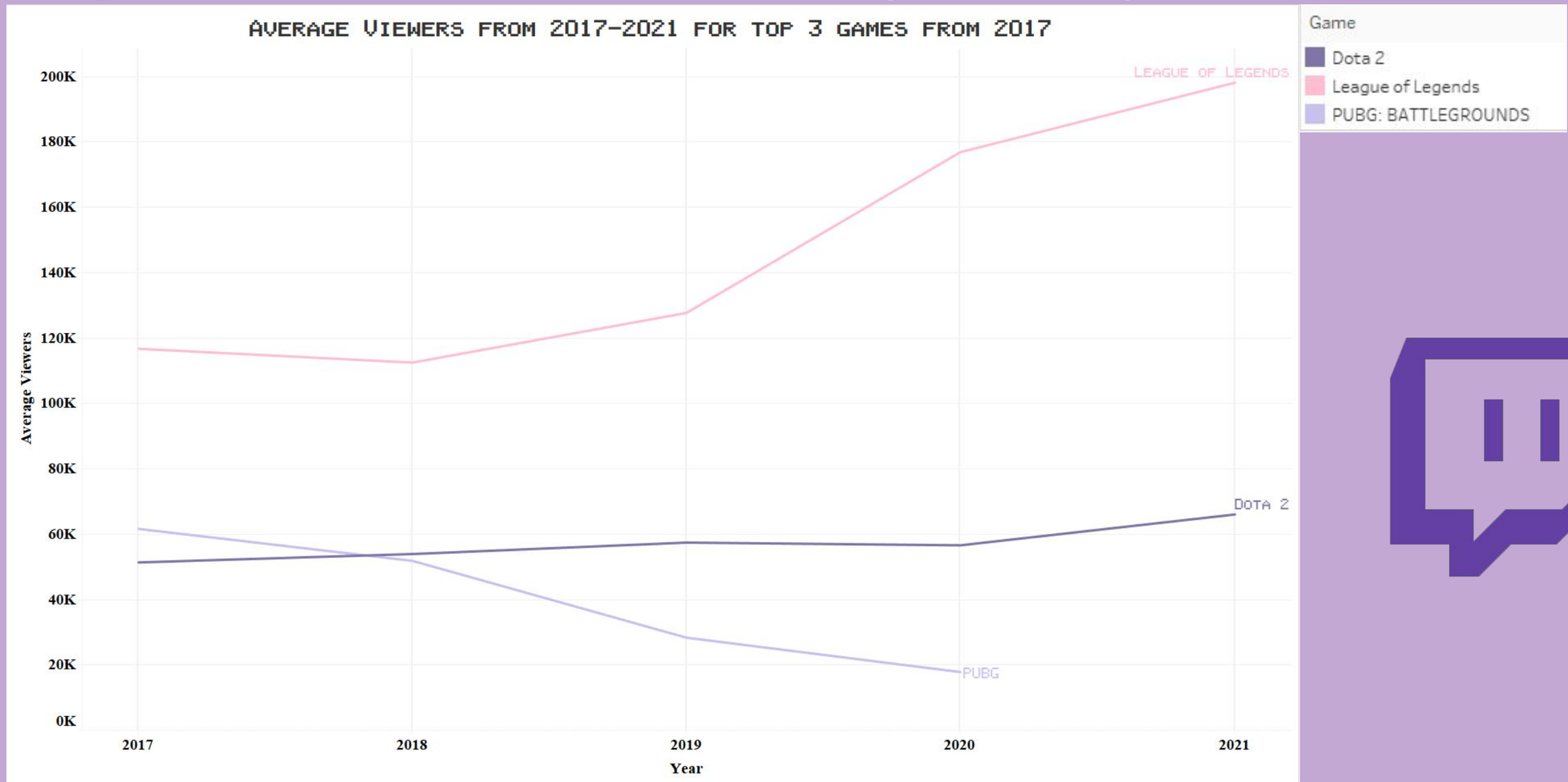
In fact, League of Legends was in the top 3 for all 4 years, while Fortnite and Just Chatting were in the top 3 for 3 out of the 4 years. It is evident these streaming channels are highly popular on the platform and maintained their popularity over these years.

This leads one to wonder, how do these statistics relate to Twitch as a whole over the given years? Did these games grow while Twitch as a platform shrunk? Did more people begin to stream these games or less?

Let's dive into the top 3 games from 2017 and see how these changed with Twitch over the next four years



Graph 2: How did the number of viewers change for these games over the next 4 years?



One can see from this data...

League of Legends had a large increase in viewers over these years; averaging in 2017 at 116,000 viewers over the course of the year and ending in 2021 with almost 200,000 viewers.

Dota 2 had a slight increase starting with around 51,000 viewers and ending with 66,000

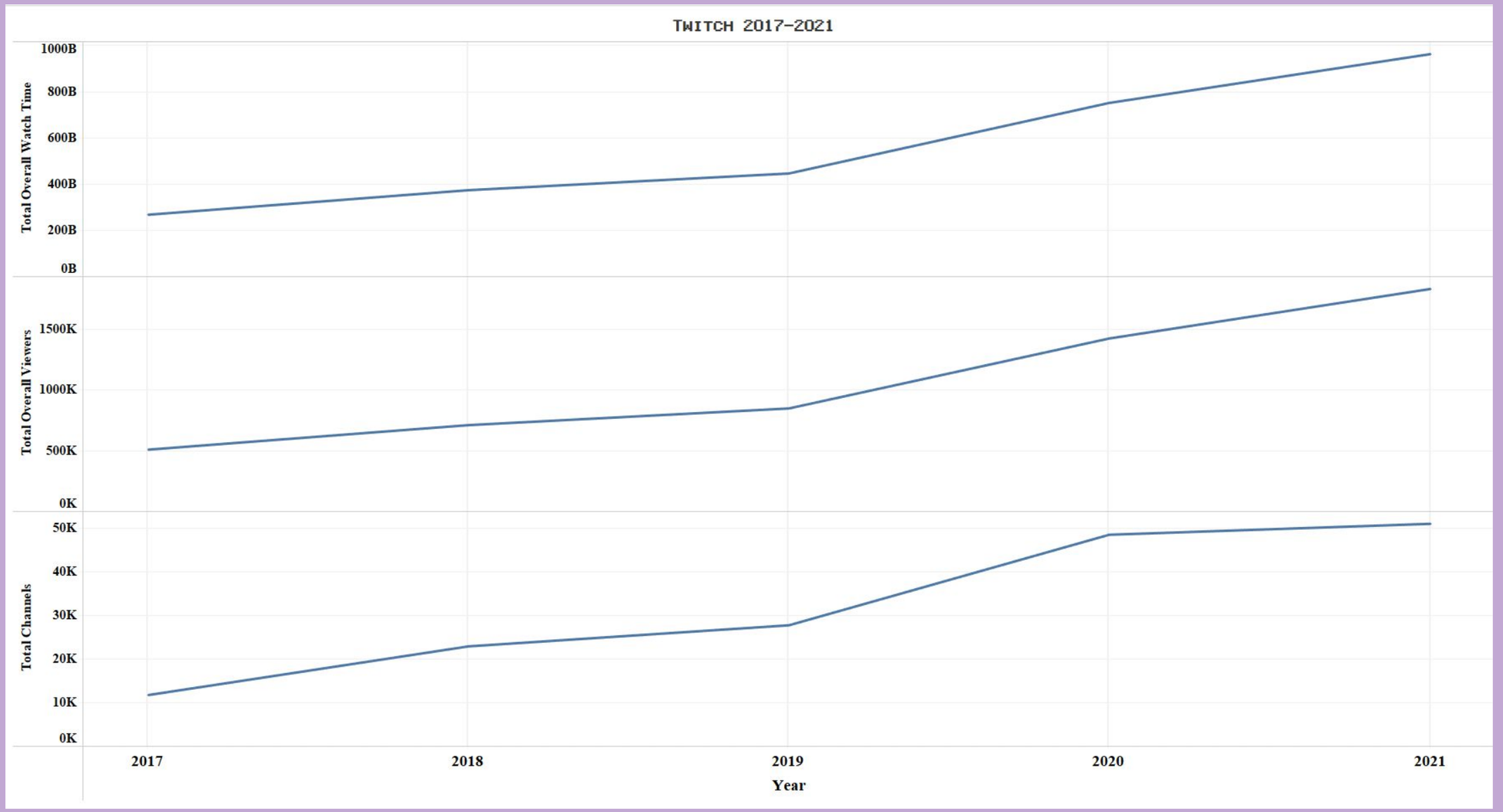
Pubg however had a steady decrease in viewership; starting with 61,000 and ending with around 18,000.

This is interesting if we compare this trend to the ranking over the 4 years, League of Legends started at rank 1 and flip flopped between rank 1 and 2 between 2017-2020 and in 2021 it fell to rank #3 in most watched games. However this channel almost doubled in viewership over the course of these years. This leads one to wonder how exactly League of Legends could grow so much yet fall in its ranking...

Although Dota had an increase over these years, League has double the amount of viewers overall; reflecting how popular League game was in 2017 and how it continued to grow despite already being miles ahead of the other games in terms of viewership

PUBG has had a steady decrease in viewers, leading one to believe this might have been a “one hit wonder” game scenario where the game had a spike – a rise in players and therefore streamers/viewers on twitch – and a fall which is common for games upon initial release if hyped in the gaming community for some time. This inference is discussed more as we dive more into other statistics behind these games

Graph 3, 3.1, 3.2:



How did Twitch as a platform change between the years 2017-2021?

Given this insight....

Watch Time:

250 billion hours → 950 billion hours

280% Increase

Total Viewers:

500,000 Viewers → 1.8 million Viewers

260% Increase

Total Channels:

12,000 channels → 51,000 channels

325% Increase

To further understand the data from the top 3 games on Twitch from 2017 over the course of the next 4 years, it is imperative to take a step back and assess how Twitch as a *platform* changed over these years first, to get a broader perspective on the exploratory data analysis.

From the side by side visualization on the previous slide, one can see that Twitch as a whole experienced a giant growth from the years 2017-2021. The total amount of viewers on the platform, the total amount of channels and the total watch time all ***tripled*** from 2017 to 2021.

Knowing this one can gain a deeper insight into the previous data from the top games in 2017.

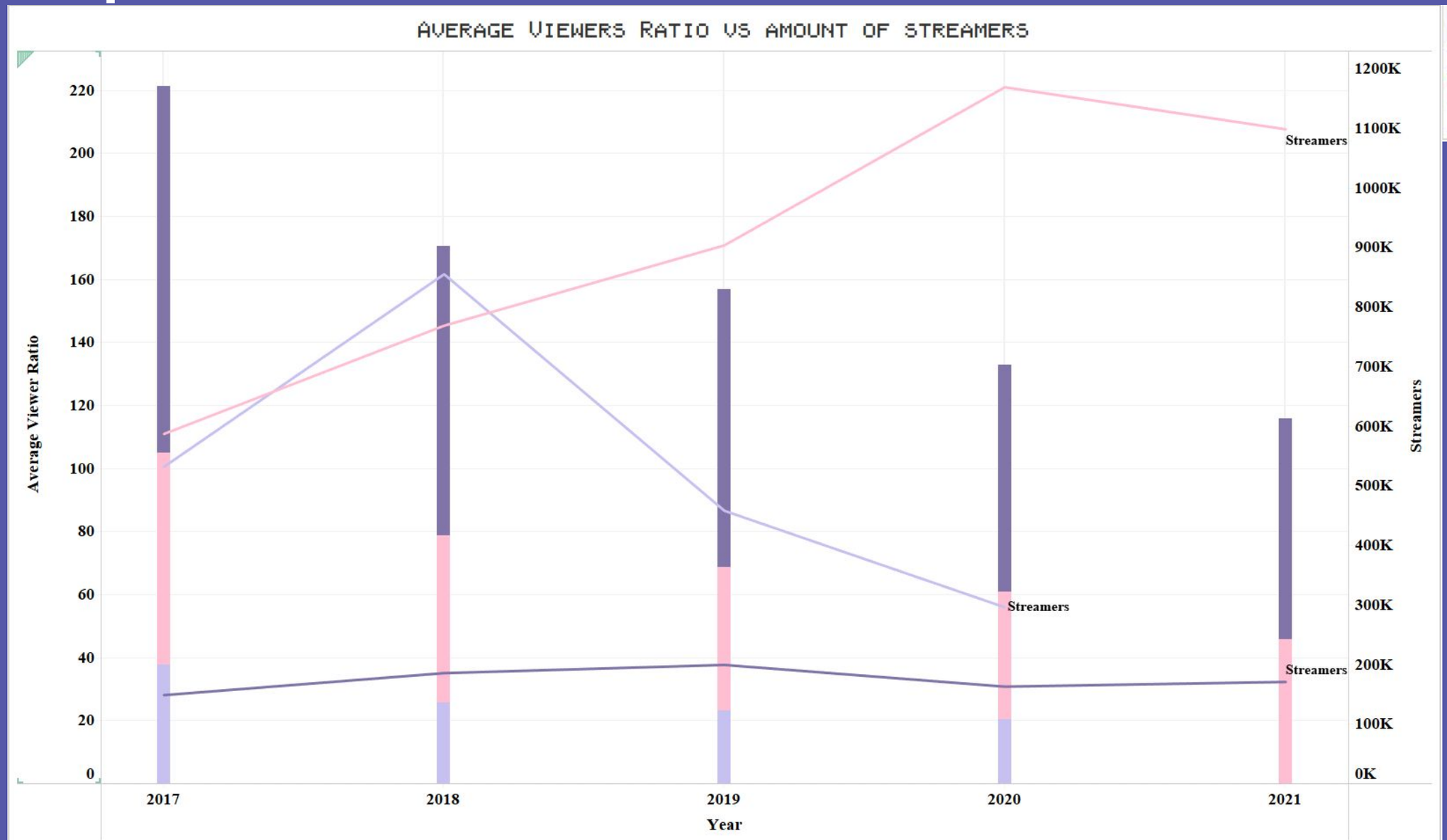
Continued...

For League of Legends, it is now less surprising to look at the data showing the growth of this game over the given years. Knowing that Twitch grew so much as a streaming service, one can expect that one of the highest viewed games in 2017 would continue to grow alongside the platform itself. And offer a symbiotic relationship to one another. As the streaming platform grows, users will most likely begin to watch streams that are already popular – as that is what is shown to them on the platform first. This therefore increases the popularity of streams for this particular game and creates a self sustaining loop. This could be an explanation as to why League of Legends remained in the top 3 most watched games in the given years, and also explain why so many games are consistently in those top 3 spots.

Dota 2's growth as a game does not correlate to the amount that Twitch grew as a platform. The average viewers on Twitch went from 500,00 to 1.8 million a while Dota 2's average viewers went from around 51,000 to 66,000. So although there is an increase in viewership in Dota 2, compared to the **260%** increase of total Twitch viewers over these years, it is not impressive that Dota only had a **23%** increase over this 4 year period; possibly explaining why it fell from the top 3 after 2018.

Now given this information; the trend of PUBG viewers over these years is quite alarming. Given the growth of the platform, one would expect even lower-viewed games to still see some growth during this time due to the influx of new Twitch users (such as DOTA 2). However, PUBG was quite the opposite, as its viewership declined drastically over the years and saw a 71% *decrease* in viewership from 2017-2021 despite the growth of Twitch as a platform.

Graph 4:



How did the average number of streamers correlate with the viewer ratio per stream from 2017 -2021 for the top 3 games from 2017?

Analysis...

A surprising insight from this graph is that the average viewer ratio decreases for each game over the years. This seems counter intuitive given the rise in Twitch viewership as a whole and specifically the increase in popularity of Dota2 and League of Legends over these years.

However, when comparing to the amount of streamers streaming these games, the bigger picture seems to make more sense, as one can see the years when the amount of streamers increases, the viewer ratio decreases, and vice-versa.

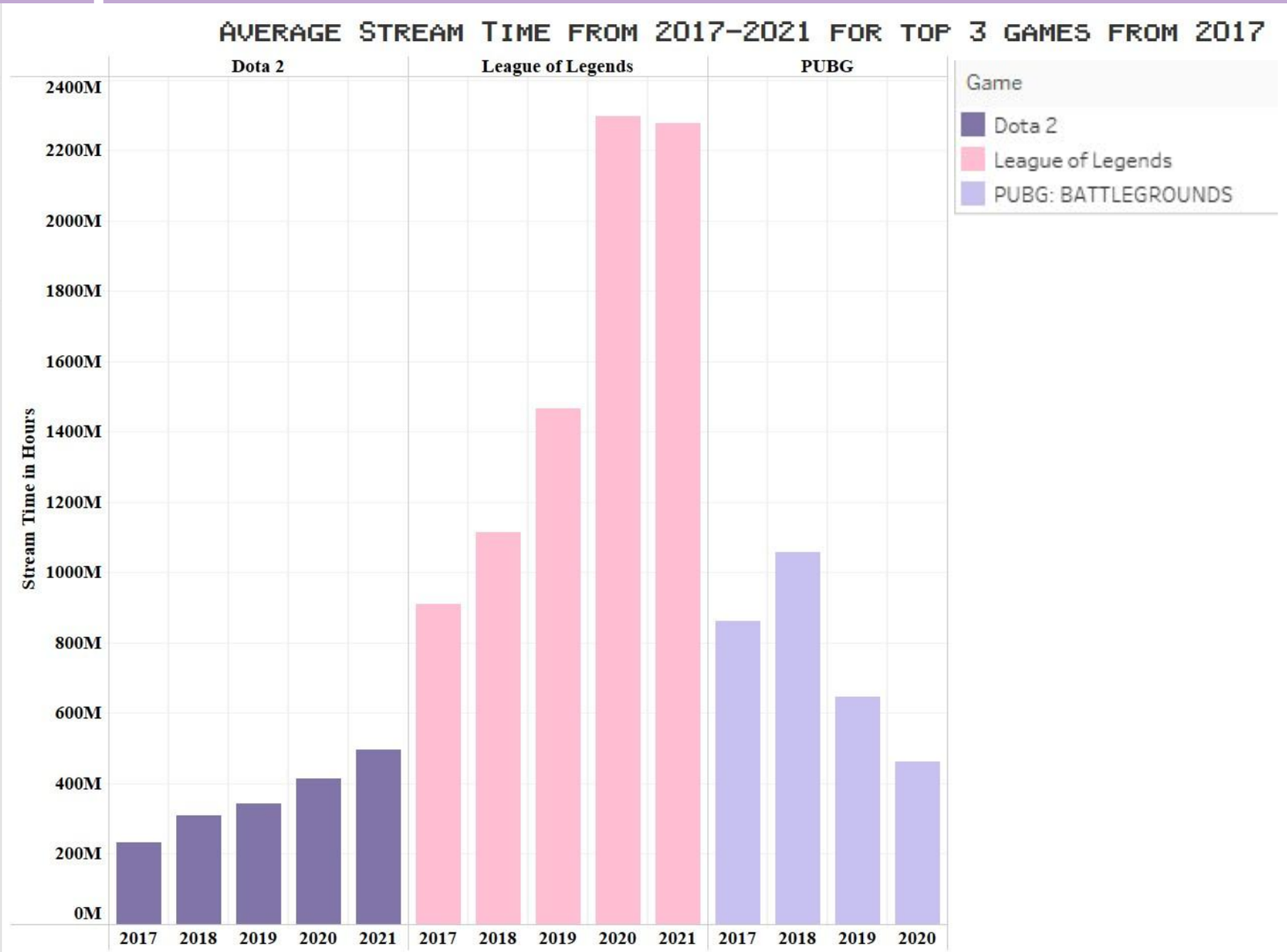
Streamers in that gaming channel ↑

Viewer Ratio in that gaming channel ↓

Dota 2 shows this conclusion the most prominently. This game has a drastically higher viewer ratio than League of Legends throughout all 4 years despite League of Legends being consistently more popular overall given the four years. However, one can see that Dota 2 has consistently the *lowest* amount of streamers, even lower than PUBG (who is consistently less popular overall during these 4 years). Thus, one can conclude that DOTA has fewer streamers overall but a higher ratio of viewers per-stream

By taking into account the previous insights we learned about Twitch as a platform over these years, one can conclude that as the amount of streamers streaming a given game increases, the viewer ratio for this game decreases and vice versa. This makes sense due to the fact that as Twitch grew over these years, more individuals would not only watch streamers, but more streamers would join the platform. Because of this influx of new streamers, in addition to new viewers, one could expect the viewership to increase but spread thinner over said gaming channel as the amount of **smaller streamers** with less viewership would increase and therefore the viewer ratio in that gaming channel would decrease. This graph shows this correlation.

Graph 5:

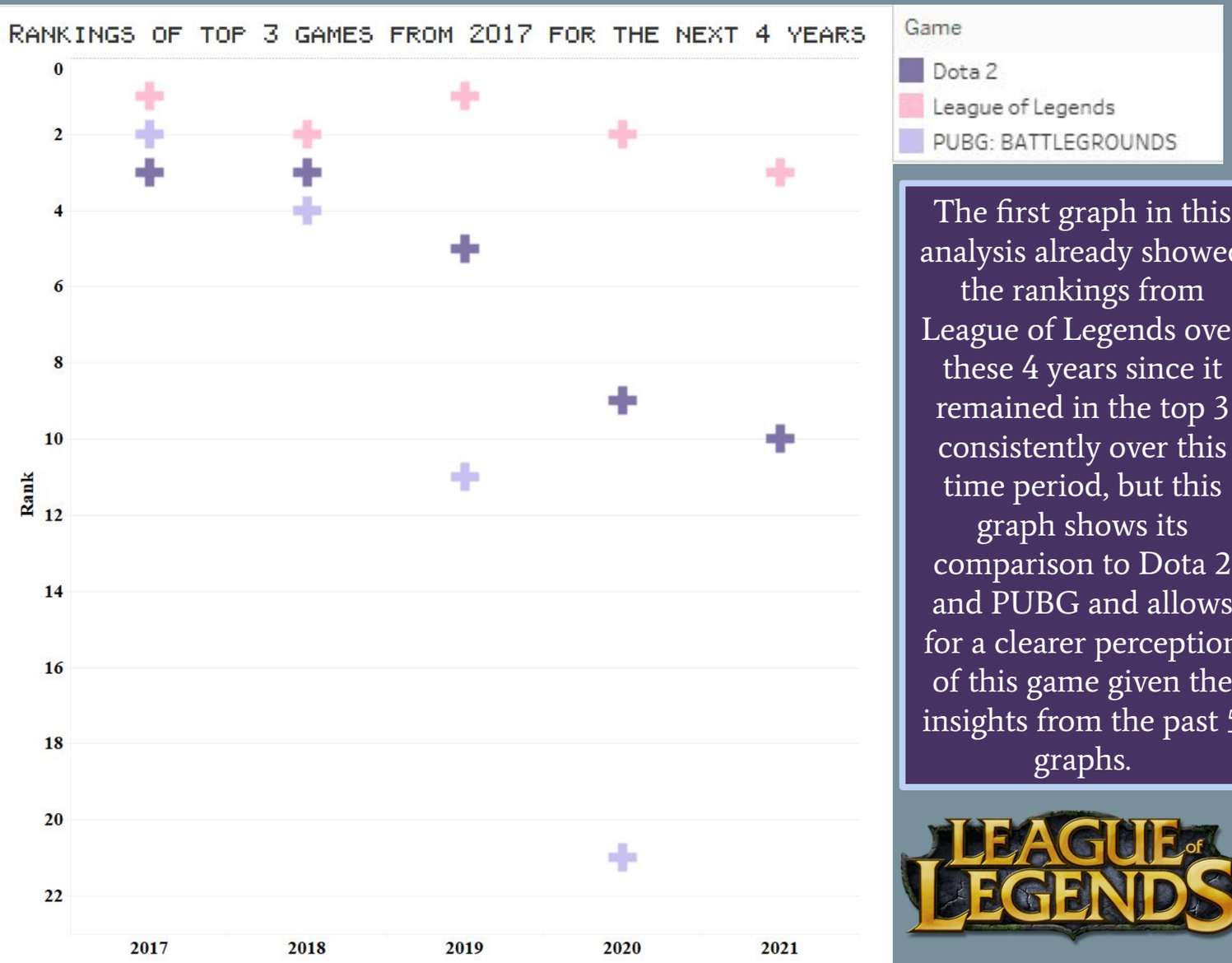


To confirm or deny the conclusions made from the previous graph, I had to wonder how the overall stream time changed for these games in the given years.

The average stream time for Dota 2 steadily increased from 2017-2021; however despite this increase, it constantly remained lower than PUBG's stream time which reflects a peak in 2018 and then drastic decrease. This insight is strange given that the ranking of DOTA is consistently higher than PUBG....However it isn't all that strange if one considers the discovery on the previous graphs...

It was concluded that Dota has less overall streams on Twitch but a higher viewer ratio than League of Legends and PUBG; the deceiving low result on this graph actually confirms my conclusion on the previous slide, because less overall streams means that the total stream time for the game will be lower. However the total *watch* time for the stream is calculated based on hours that viewers watch. So even though there are fewer streams, and therefore smaller overall stream time, the ones that are present therefore must have higher viewer counts to explain the ranking of Dota 2 in graph 1 and the trends one can see for Dota 2 in graph 2... and therefore the conclusion made from graph 4 is verified in this graph.

Graph 6:



To gain further insight, one can check how the ranking of these games based on watch time changed over these years.

The first graph in this analysis already showed the rankings from League of Legends over these 4 years since it remained in the top 3 consistently over this time period, but this graph shows its comparison to Dota 2 and PUBG and allows for a clearer perception of this game given the insights from the past 5 graphs.

Dota 2 fell considerably in its ranking over these years starting at #3 and ending at #10. The downward trend in this graph contradicts the Average Viewers (graph 2) and Stream Time (graph 4) trends but makes sense when analyzed all together given the increase in overall Twitch viewership (graph 3), decrease in overall Dota 2 stream time (graph 5) and consequential decrease in viewer ratio (graph 4).

One might have noticed the statistics for PUBG over these years stopped in 2020, this graph explains this phenomenon as one can see that PUBG fell all the way to Rank 21 in the year 2020; and since this data only includes the top 25 most watched games per year, one can conclude that this decline in the popularity of PUBG continued into 2021 launching it lower than the 25th rank and out of the data set for 2021

LEAGUE of LEGENDS

DOTA 2

PLAYERUNKNOWN'S BATTLEGROUNDS

Final conclusions from this analysis

League of Legends saw an increase in viewership throughout 2017-2021 (graph 2). With the increase in Twitch popularity as a whole (graph 3), League of Legends began as a dominant player in the Twitch scene and continued to rise alongside the platform as a whole, creating a symbiotic relationship between the platform and gaming channel and securing its consistent spot in the top 3 most watched games over these years (graph 1). The average viewer ratio decrease, alongside the increase in number of streamers streaming League of Legends (graph 4), allows for a greater insight into the data; leading one to conclude that more streamers must have took to streaming this already popular game while at the same time the amount of viewers watching that game increased as well, therefore creating a broader spread of viewers for the channel. All of these graphs support the increase in stream time we see (graph 5) and allow for a greater understanding of where this game sits relative to the growth of Twitch and other games on this platform (graph 6).

Final conclusions from this analysis

Dota 2 presents a more complicated analysis. One can see its ranking start at 3 then fall to 10 over these years (graph 6). The growth on Twitch (graph 3) as well as the growth of Dota 2 itself in viewership (graph 2) leads this fall in rank to be bewildering; however given the percent change, we can see that Dota 2's increase in viewers was not substantial enough to correspond with Twitchs' popularity increase and partially explains the decrease in ranking. Further analysis presented another interesting observation, as Dota 2 had the highest viewer ratio, yet the lowest number of streamers, (graph 4) however given the stream time (graph 5), compared with the average viewers (graph 2), one can conclude Dota 2's presence on Twitch most likely consists of fewer overall streamers with larger amounts of viewers. Taking into account the fact that Dota 2 had only a slight increase in the number of streamers, (graph 4) this influence is more substantial compared to other games since it has such a high ratio of viewers per stream. All of this added together justifies the decrease in rating over the years; as Twitch grew substantially, Dota 2's overall streamers and viewers only increased slightly, therefore reducing its viewer ratio (which is of high impact to the performance of the game on the platform) and subsequently decreasing its overall rating.

Final conclusions from this analysis

PUBG had the most drastic change in rating starting at 2 and falling to out of data range (>25) (graph 6). This is reflected in PUBG's decrease in average viewers (graph 2) and amplified by Twitch's increase in popularity as a platform (graph 3). PUBG consistently offered the lowest streamer ratio compared to the other two games but saw a spike in number of streamers in 2018 (graph 4). This increase is streamers surprisingly surpassed League of Legends and Dota in 2018, and was reflected in the stream time for PUBG in that year increasing (graph 5) as well. The ratio of viewers per stream was consistently very low for PUBG, which corresponds to a broader spread of viewers over this gaming channel, making sense of the increase in streamers and subsequent stream time increase. However this spike in popularity of streamers (graph 4) and stream time (graph 5) was short lived. Inferring from the release of the game being in 2017, one can conclude PUBG experienced the phenomenon of streamer/player excitement around new releases, but falling off quickly once the game gets older and losses this "initial release hype." This is confirmed in graph 6, and justified in analyzing PUBG's overall decrease in viewership (graph 2) despite the growth of Twitch (graph 3).

Citations

Boyd, D. (2022). *Twitch statistics and analytics*. Hi I'm SullyGnome! Retrieved January 29, 2022, from https://sullygnome.com/

Kim, E. (2014, August 25). *Amazon buys Twitch for $970 million in cash*. Business Insider. Retrieved January 29, 2022, from https://www.businessinsider.com/amazon-buys-twitch-2014-8

Upload & discover PNG files without a hitch! CleanPNG. (n.d.). Retrieved January 30, 2022, from https://www.cleanpng.com/

Data analysis tools:

Excel
Tableau